Childhood Obesity in Ireland: The role of selected Maternal and Infant Factors

Data from the GUI Study

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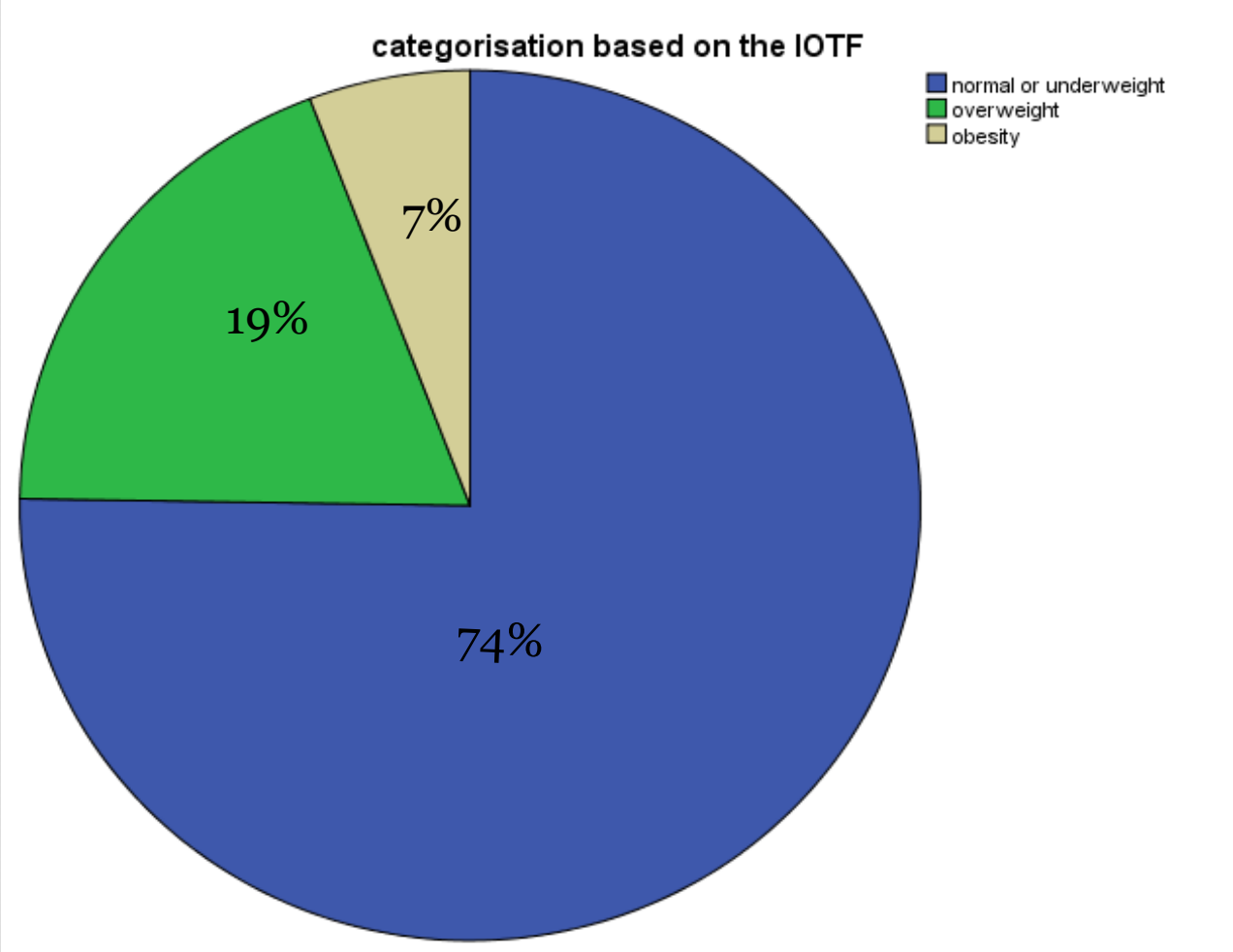
Overweight & Obesity in Children

- Obesity among children and adults is increasing worldwide
- Prevalence has reached epidemic levels in developed and developing countries (WHO-'Globesity')
- Approx 170m children worldwide are overweight/ obese, 92m children are at risk (Lancet 2008,WHO)
- GUI 2011: Child cohort found 26% of 9 year-olds are overweight or obese

- *Childhood obesity tends to track into adulthood*

Percentages of Normal, Overweight and Obese 9 year-olds in Ireland (GUI, child cohort)



IOTF: International Obesity Task Force

Overweight & Obesity in Children

- Obesity is a preventable disease
- Childhood obesity will become a risk factor for several chronic conditions, e.g. CV disease, etc
- Obesity can be also detrimental to the emotional and psychological health of children and youth
- GUI - lower Piers Harris score, lower reading and maths scores, more problems with peers
- Three-fold increase in the economic burden of childhood obesity and obesity-related hospital costs

Issues with studying Overweight / Obesity

- No universally accepted definition of overweight / obesity:
  - CDC (USA), UK90 Charts, IOTF
- (IOTF) Overweight and obesity defined as a sex-specific BMI of:
  - $\geq 85^{th}$ percentile of BMI for age (overweight)
  - $\geq 95^{th}$ percentile of BMI for age (obese)

Research Questions

- Are maternal factors such as level of education, poverty level of the household, current BMI / obesity, smoking and alcohol consumption during pregnancy associated with childhood overweight and obesity?
- Specifically, do children of non-Caucasian mothers have higher prevalence of overweight and obesity than Caucasian children?
- Are infant factors such as birth weight, being a singleton or having been breastfed associated with childhood overweight & obesity?

Research Methods I

- Quantitative research project, secondary data analysis from the GUI study: child cohort
- The sample size: 8,568 9 year-old children randomly selected from a total of 3,326 primary schools.
- Data were collected using GUI Questionnaires; CAPI and PAPI.
- Study was conducted in two phases; in the child's school and home.
- BMI computed from height (cms) [using Leicester portable stick] and weight (kgs) [using SECA 761 scale]

Study Variables

Dependent Variable: Child Obesity (Yes/No)

Independent Variables:

Infant Factors

- Child's gender
- Birth weight
- Breastfeeding (Yes/No)
- Duration of breastfeeding
- Singleton (Yes/No)

Maternal Factors

- Age (teen mother/other)
- Level of Education
- Ethnicity
- Household poverty
- Weight/BMI & Obesity
- Attempted weight loss
- Smoking/Alcohol in pregnancy

Research Methods III

- Data were analysed using PASW Statistics 18
- New variables created:
  - Child's BMI & child obesity
  - Poverty of the household (above/below of 60% of the median income for the sample)
  - Maternal obesity
- Variable categories combined for Maternal Education (3 categories from 6 recorded)
- Statistical tests to determine significance levels

Maternal Factors I

	Normal Weight (n=6,120)	Overweight/ Obese (n=2,013)	p value
Age •20 yrs and over •19 yrs and under	5,969 (97.5%) 151 (2.5%)	1,945 (96.6%) 68 (**3.4%**)	p=0.03
	(n=6,116)	**(n=2,013)**	
Education •None /Lower Sec •Higher Sec /Voc •Degree /Post grad	978 (16.0%) 3,440 (56.2%) 1,701 (27.8%)	449 (**22.3%**) 1,152 (57.2%) 412 (20.5%)	p<0.001

Maternal Factors II

	Normal Weight (n =6,116)	Overweight/ Obese (n =2,013)	p value
Ethnicity •Caucasian •Non Caucasian	5,947 (97.2%) 174 (2.8%)	1,936 (96.2%) 77 (**3.8%**)	p=0.03
	(n=6,120)	**(n=2,013)**	
Poverty Level •Above •Below	4,821 (84.8%) 862 (15.2%)	1,521 (81.7%) 340 (**18.3%**)	p=0.01

Maternal Factors III

	Normal Weight (n= 5,825)	Overweight/ Obese (n=1,873)	p value
Maternal Weight			
•Normal/Underweight	3,211 (55.1%)	624 (33.3%)	p<0.001
•Overweight/Obese	2,614 (44.9%)	1,249 (**66.7%**)	
	(n=6,119)	(n=2,012)	
Attempted Wgt loss			
•Often / Very Often	1,144 (18.7%)	636 (**31.7%**)	p<0.001
•Sometimes	1,318 (21.5%)	456 (22.7%)	
•Rarely	882 (14.4%)	261 (13.0%)	
•Never	2,775 (45.4%)	659 (32.8%)	

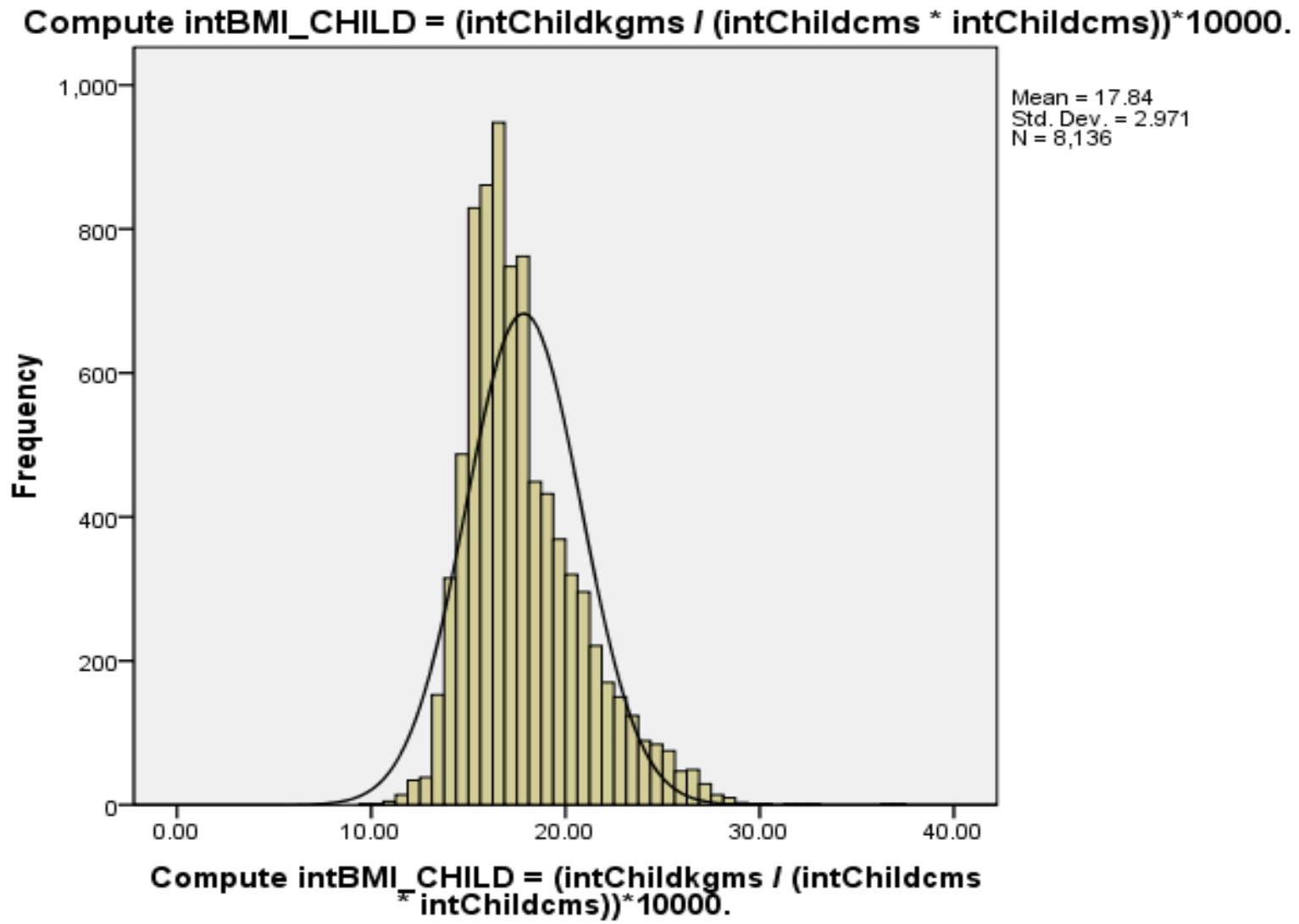
Maternal factors IV

	Normal Weight (n=5885)	Overweight/ Obese (n=1937)	p value
Smoking •Never •Occasionally •Daily	4,693 (79.7%) 525 (8.9%) 667 (11.3%)	1,391 (71.8%) 214 (11.0%) 332 (**17.1%**)	p<0.001
	(n=5,881)	(n=1,937)	
Alcohol Consum •Never •Occasionally •Weekly/more	3,503 (59.6%) 2,302 (39.1%) 76 (1.3%)	1,256 (**64.8%**) 646 (33.4%) 35 (1.8%)	p<0.001

Infant Factors I

	Normal Weight (n =6,120)	Overweight / Obese (n =2,013)	p value
Gender • Male • Female	 3,101 (50.7%) 3,019 (49.3%)	 857 (42.6%) 1156 (**57.4%**)	**p<0.001**
	(n=6,116)	**(n=2,013)**	
Singleton •Yes •No	 5,942 (97.1%) 178 (2.9%)	 1,974 (**98.1%**) 39 (1.9%)	**p=0.02**

GUI Data: Graph of BMI distribution



Infant factors II

	Normal Weight (n=6120)	Overweight/ Obese (n=2013)	p value
Birth weight(kgs) mean (sd)	3.50 (0.61)	3.58 (0.62)	ns*
Current BMI (kgs/m2) mean (sd)	16.46 (1.55)	22.04 (2.20)	p<0.001

ns*= non significant

Infant factors III

	Normal Weight (n= 6065)	Overweight/ Obese (n= 1997)	p value
Ever Breastfed •Yes •No	3,233 (53.3%) 2,892(46.7%)	900 (45.1%) 1,097(**54.9%**)	p<0.001
	(n=3,223)	**(n=896)**	
Duration of Breastfeeding Mean(sd)	4.35 (3.66)	4.10 (3.57)	ns*

ns*= non significant

Descriptive Statistics Summary

- 26% of children in the total GUI sample were overweight/ obese
- Among 2,013 overweight/obese children 57% were girls, 43% were boys
- 66% of overweight/obese children have overweight / obese mothers, compared with 33% normal
- 30% of children of non-Caucasian mothers obese compared with 24% with Caucasian mothers
- 45% of breastfed children were overweight /obese compared to 55% not breastfed
- 32% overweight/obese children compared with 20% of normal - mothers very often tried to lose weight

Logistic Regression: Predictors of Childhood Obesity (1)

Predictors	B	*p* value	OR
Female child	**.30**	**.000**	**1.36**
Non-singleton	**-.42**	**.032**	**.65**
Child was breastfed	**-.17**	**.006**	**.84**
Mother was a teenager at birth	.06	NS	1.06
Household above poverty level	.04	NS	1.04
Non-Caucasian mother	**.47**	**.003**	**1.61**
Mother is currently obese	**.77**	**.000**	**2.16**
Attempted weight loss (mother)		.000	
(*very often* –ref. cat.)			
often	-.17	NS	.84
sometimes	-.50	.000	.60
rarely	-.43	.000	.64
never	-.54	.000	.58

Logistic Regression: Predictors of Childhood Obesity (2)

Predictors	B	*p* value	OR
Smoking during pregnancy		.000	
(n*ever* – ref. cat.)			
occasionally	.37	.000	1.45
daily	.39	.000	1.47
Alcohol cons. during pregnancy		.006	
(*never* – ref. cat.)			
occasionally	-.18	.004	.83
daily	.21	NS	1.24
Mother's education (*none-/lower sec.*– ref. cat)		.011	
Higher sec/Tech/Voc	-.09	NS	.90
Degree, Post grad.	-.28	.004	.75
Constant	-1.19	.000	.30

Conclusions

Increased risk of obesity was associated with:

- lower maternal education
- non-Caucasian mothers
- household poverty
- smoking during pregnancy
- maternal obesity

Protective factors were associated with:

- breastfeeding
- well-regulated maternal weight (when mother was *not* trying to lose weight often)
- child being non-singleton
- high maternal education;

- No clear evidence that drinking alcohol during pregnancy is a risk factor for child obesity => need for further studies

Limitations

- Cross-sectional data only. Cannot comment on causation
- Non-Caucasian mothers were underrepresented in the GUI (3.2%) => approximately 10% of the Irish population is of foreign decent (CSO, 2006)
- The set of variables used in this study is likely to be a subset of variables potentially associated with obesity

Summary & Policy Implications

- We examined the association between childhood obesity and the possible influence of selected maternal and infant variables
- These findings support the hypothesis that there are associations between maternal factors and infant factors and childhood obesity
- The findings point to need for a multifactorial approach to the prevention of childhood overweight and obesity

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